

What is claimed is:

1. An on-wafer monitoring system capable of measuring an operation of a plasma treatment apparatus on a wafer, said system comprising:

one or a plurality of sensor sections, a power source unit, and an I/O unit that inputs/outputs signals from/to outside, which are provided on a silicon substrate,

wherein said sensor sections have pattern portions, and a plurality of electrodes for separating ions and electrons of plasma by energy, and include electrodes having the same potential as that of said silicon substrate directly under said pattern portions.

2. The on-wafer monitoring system according to Claim 1,

wherein a plurality of electrode of said sensor sections are Al electrodes, and space between each of the Al electrodes is insulated by γ - Al_2O_3 .

3. The on-wafer monitoring system according to Claim 2,

wherein the side surface of said Al electrodes is covered with a thin oxide film.

4. The on-wafer monitoring system according to any one of Claims 1 to 3,

wherein said power source unit takes out power from plasma potential or takes out power from photoelectromotive force of a PLZT device.

5. The on-wafer monitoring system according to any one of Claims 1 to 4,

wherein said I/O unit inputs/outputs signals from/to outside by light.

6. The on-wafer monitoring system according to any one of Claims 1

to 5,

wherein said system includes an ion energy analyzer, which has a collector electrode at a sensor section bottom and measures ion current in the collector electrode to obtain ion energy distribution, as said sensor.

7. The on-wafer monitoring system according to any one of Claims 1 to 6,

wherein said system includes a photon detector, which detects light made incident into a pattern by photoinduced current generated in an insulating film, as said sensor.

8. The on-wafer monitoring system according to any one of Claims 1 to 7,

wherein said photon detector forms a metal thin film on said insulating film, and detects light having energy equivalent to or more than an energy difference between the work function of the metal and the conduction band bottom of said insulating film out of light transmitted the metal thin film.

9. The on-wafer monitoring system according to any one of Claims 1 to 6, wherein

said system includes a photon detector that detects light by a photo diode, as said sensor.

10. The on-wafer monitoring system according to any one of Claims 1 to 9,

wherein said system includes an ion radical analyzer, which identifies radicals and ions by detecting light emission by the collision between electrons from an electron gun and radicals or ions, as said sensor.

11. The on-wafer monitoring system according to Claim 10,

wherein said ion radical analyzer has a spectroscope for detecting

light emission.

12. The on-wafer monitoring system according to any one of Claims 1 to 11,

wherein said system includes a probe, which detects at least one of electron current, electron energy distribution, ion current, electron temperature, electron density, and charge storage amount, as said sensor.